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(54) **ELECTROSTATIC SPRAY TOOL SYSTEM**

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CPC B05B 5/03; B05B 5/053; B05B 12/002; B05B 5/0255; B05B 5/043; B05B 5/0533; B05B 1/005; B05B 9/01

USPC 239/690, 690.1, 704, 706, 707, 708, 239/417.3, 526, 527

See application file for complete search history.

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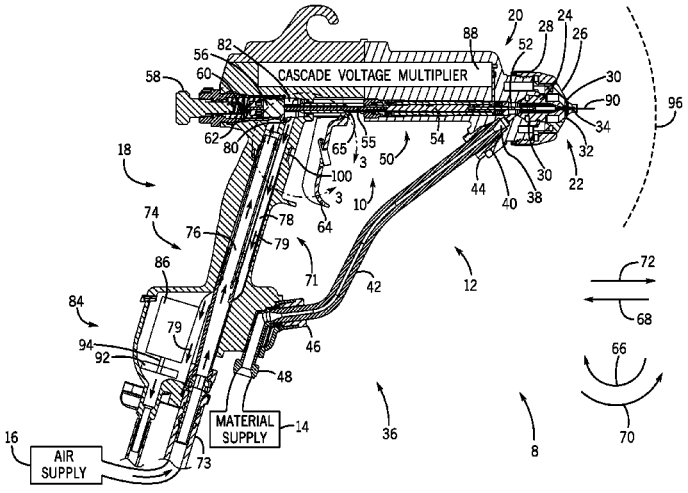
(57) **ABSTRACT**

A system including an electrostatic tool including a handle, a first trigger configured to move between a first trigger position and a second trigger position, wherein the electrostatic tool is configured to be inactive when the first trigger is in the first trigger position and to spray a coating material when the first trigger is in the second trigger position, an electrostatic activation system configured to activate and deactivate electrical charging of the coating material, and wherein the first trigger and the electrostatics activation system may be separately and simultaneously engaged with a single hand.

24 Claims, 5 Drawing Sheets



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B05B 12/00 (2006.01)

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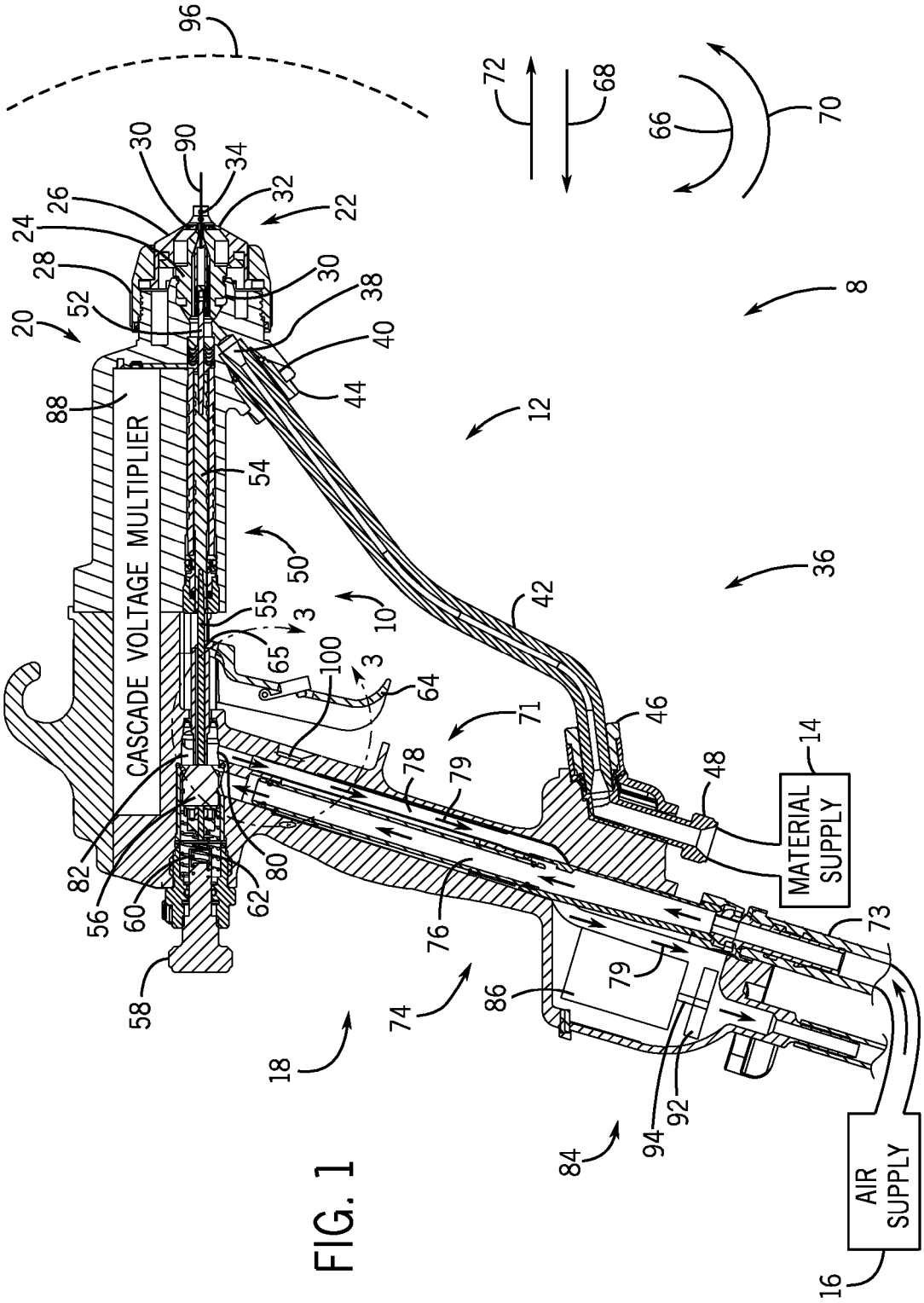


FIG. 1

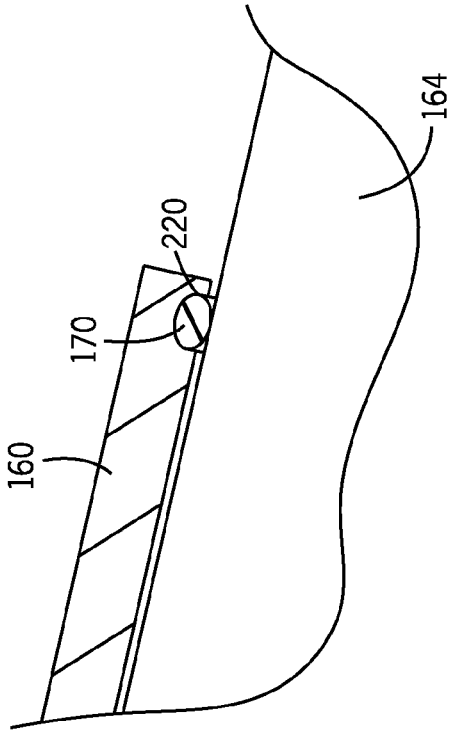


FIG. 10

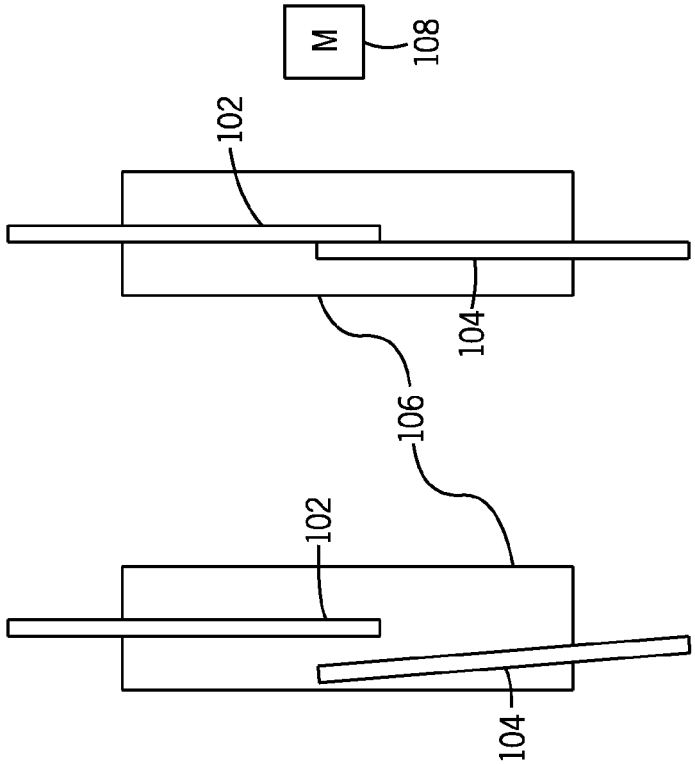


FIG. 2

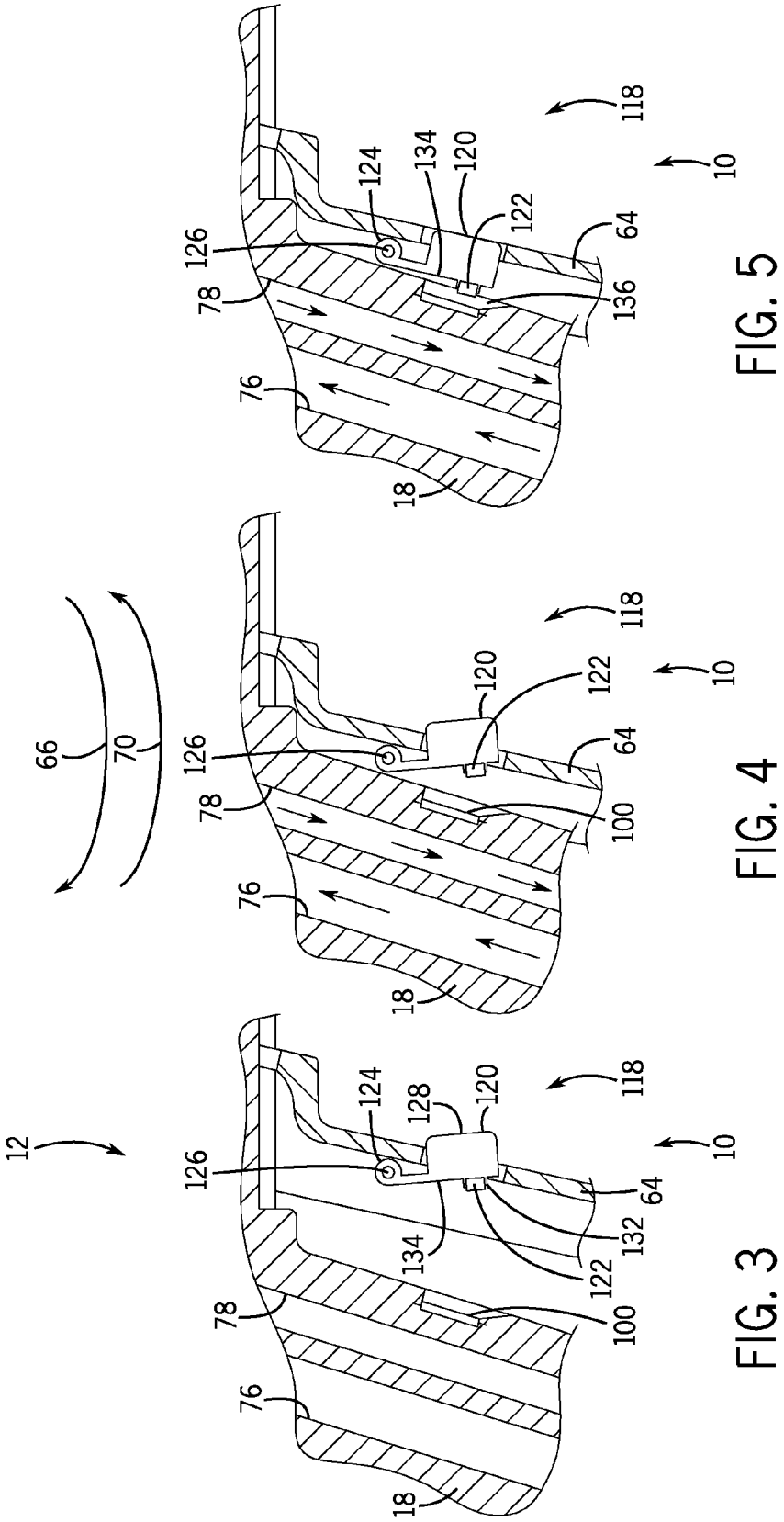


FIG. 3

FIG. 4

FIG. 5

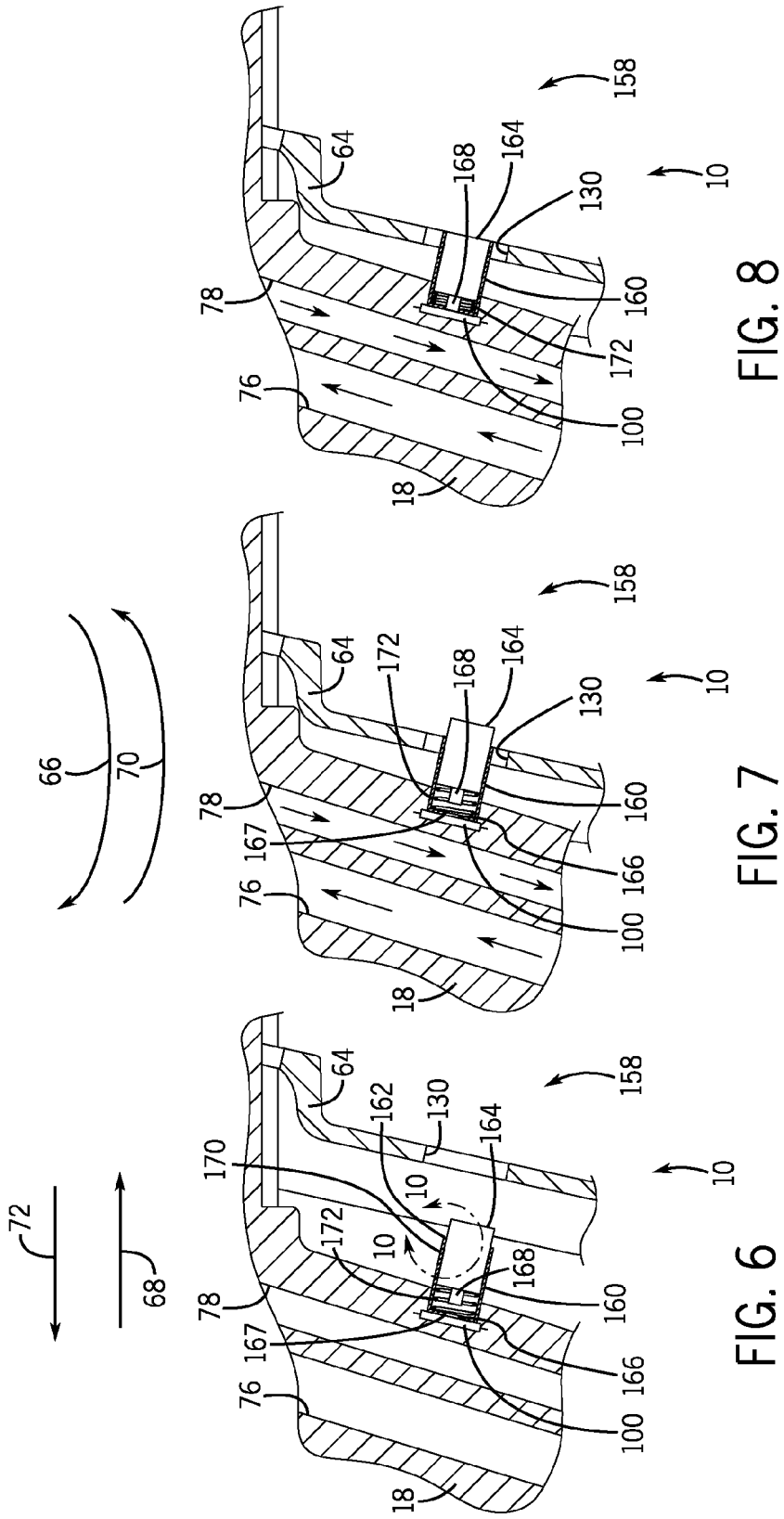
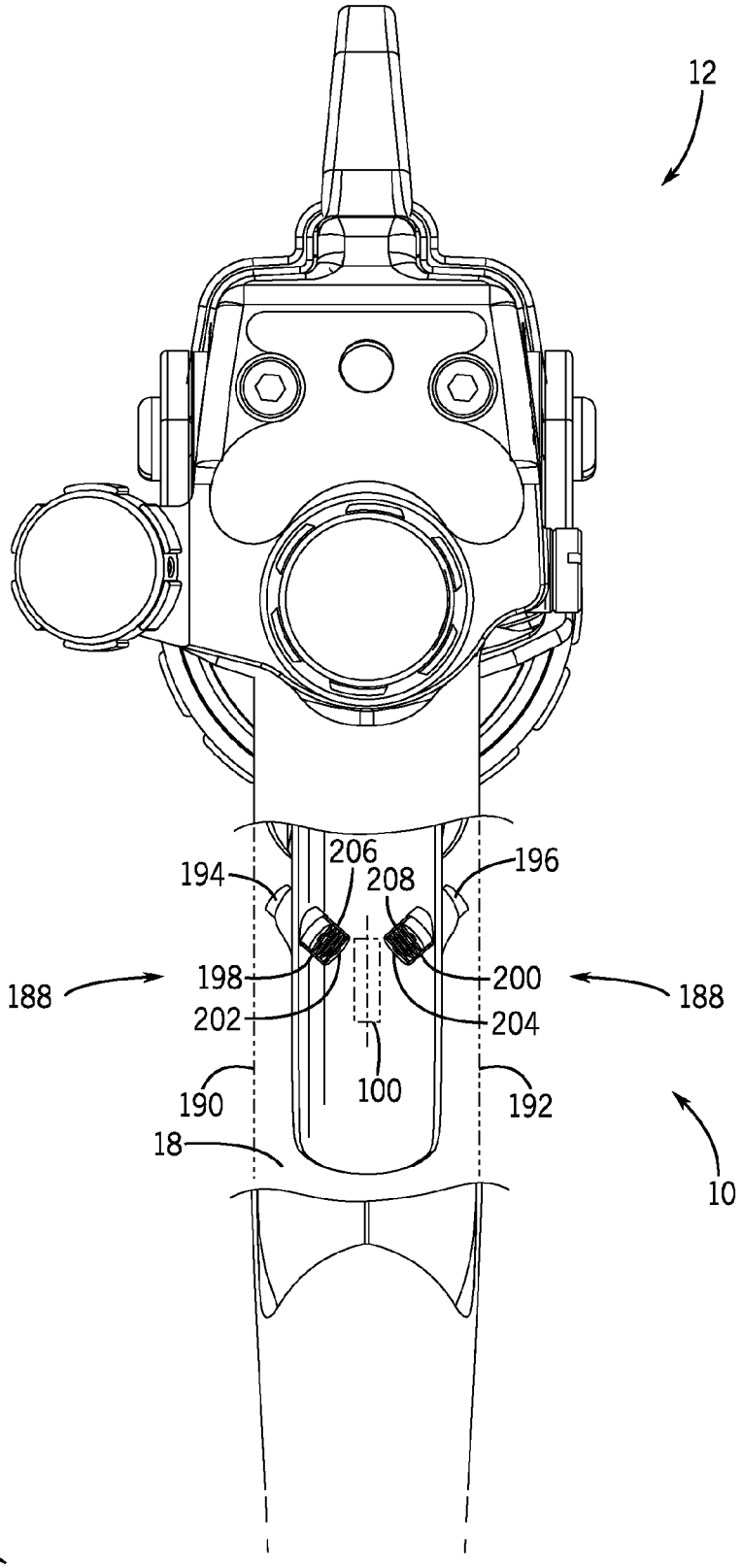


FIG. 6

FIG. 7

FIG. 8

FIG. 9



ELECTROSTATIC SPRAY TOOL SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

This Application is a Non-Provisional Application and claims priority to U.S. Provisional Patent Application No. 61/813,135, entitled "Electrostatic Spray Tool System", filed Apr. 17, 2013, which is herein incorporated by reference.

BACKGROUND

The invention relates generally to an electrostatic spray tool.

Electrostatic spray tools output sprays of electrically charged materials to more efficiently coat objects. For example, electrostatic tools may be used to paint objects. In operation, a grounded target attracts electrically charged materials sprayed with compressed air from an electrostatic tool. As the electrically charged material contacts the grounded target, the material loses the electrical charge. Unfortunately, the electric charge on the electrically charged material may block or inhibit spraying operations in tight spaces (e.g., corners).

BRIEF DESCRIPTION

Certain embodiments commensurate in scope with the originally claimed invention are summarized below. These embodiments are not intended to limit the scope of the claimed invention, but rather these embodiments are intended only to provide a brief summary of possible forms of the invention. Indeed, the invention may encompass a variety of forms that may be similar to or different from the embodiments set forth below.

In a first embodiment a system, including an electrostatic tool including a handle, a first trigger configured to move between a first trigger position and a second trigger position, wherein the electrostatic tool is configured to be inactive when the first trigger is in the first trigger position and to spray a coating material when the first trigger is in the second trigger position, an electrostatic activation system configured to activate and deactivate electrical charging of the coating material, and wherein the first trigger and the electrostatics activation system may be separately and simultaneously engaged with a single hand.

In another embodiment a system, including an electrostatic tool including a handle, a first trigger configured to move between a first trigger position and a second trigger position, wherein the electrostatic tool is configured to be inactive when the first trigger is in the first trigger position and to spray a coating material when the first trigger is in the second trigger position, an electrostatic activation system coupled to the first trigger, and wherein the electrostatic activation system is configured to activate and deactivate electrical charging of the coating material, and wherein the first trigger and the electrostatics activation system may be separately and simultaneously engaged with a single hand.

In another embodiment a system, including an electrostatic tool including a handle, a first trigger configured to move between a first trigger position and a second trigger position, wherein the electrostatic tool is configured to be inactive when the first trigger is in the first trigger position and active when the first trigger is in the second trigger position, an electrostatic activation system coupled to the handle, and wherein the electrostatic activation system is configured to activate and deactivate electrical charging of the coating material, and wherein the first trigger and the electrostatics activation system may be separately and simultaneously engaged with a single hand.

DRAWINGS

These and other features, aspects, and advantages of the present invention will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

FIG. **1** is a cross-sectional side view of an electrostatic tool system with an electrostatics activation system according to an embodiment;

FIG. **2** is a cross-sectional view of a Reed switch according to an embodiment;

FIG. **3** is a partial cross-sectional side view of an embodiment of an electrostatic tool system with an electrostatics activation system, taken along line **3-3** of FIG. **1**;

FIG. **4** is a partial cross-sectional side view of an embodiment of an electrostatic tool system with an electrostatics activation system, taken along line **3-3** of FIG. **1**;

FIG. **5** is a partial cross-sectional side view of an embodiment of an electrostatic tool system with an electrostatics activation system, taken along line **3-3** of FIG. **1**;

FIG. **6** is a partial cross-sectional side view of an embodiment of an electrostatic tool system with an electrostatics activation system, taken along line **3-3** of FIG. **1**;

FIG. **7** is a partial cross-sectional side view of an embodiment of an electrostatic tool system with an electrostatics activation system, taken along line **3-3** of FIG. **1**;

FIG. **8** is a partial cross-sectional side view of an embodiment of an electrostatic tool system with an electrostatics activation system, taken along line **3-3** of FIG. **1**;

FIG. **9** is a partial rear cross-sectional view of an embodiment of an electrostatic tool system having an electrostatic activation system; and

FIG. **10** is a partial cross-sectional view of an embodiment of an electrostatic activation system taken along line **10-10** of FIG. **6**.

DETAILED DESCRIPTION

One or more specific embodiments of the present invention will be described below. In an effort to provide a concise description of these embodiments, all features of an actual implementation may not be described in the specification. It should be appreciated that in the development of any such actual implementation, as in any engineering or design project, numerous implementation-specific decisions must be made to achieve the developers' specific goals, such as compliance with system-related and business-related constraints, which may vary from one implementation to another. Moreover, it should be appreciated that such a development effort might be complex and time consuming, but would nevertheless be a routine undertaking of design, fabrication, and manufacture for those of ordinary skill having the benefit of this disclosure.

When introducing elements of various embodiments of the present invention, the articles "a," "an," "the," and "said" are intended to mean that there are one or more of the elements. The terms "comprising," "including," and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

The present disclosure is generally directed to an electrostatic tool system capable of electrically charging a material sprayed with a compressed gas, such as air. More specifically,

the disclosure is directed towards an electrostatics activation system that enables an operator to selectively apply an electrostatic charge to a coating material with a single hand. For example, while continuously spraying a coating material, an operator may alternate between adding and removing an electrical charge to the coating material. In some embodiments, the electrostatics activation system may include an electrostatics trigger that activates the electrostatics independently of a main trigger for spraying the coating material. The electrostatics trigger may be coupled to the main trigger enabling an operator to activate and deactivate the electrostatics with a single hand and without removing visual contact from a target. In other embodiments, the electrostatics activation system may include a plunger mechanism that enables an operator to activate and deactivate the electrostatics without removing visual contact from a target. The ability to hold an electrostatic tool and selectively turn the electrostatics on and off with a single hand enables an operator to continuously spray different objects and locations. For example, some objects may have a geometry (e.g., corners) that impedes coating using electrostatics. Accordingly, during continuous spraying operations, an operator may alternate between spraying a coating material with an electric charge and spraying the coating material without an electric charge.

FIG. **1** is a cross-sectional side view of an electrostatic tool system **8** with an electrostatic activation system **10**. The electrostatics activation system **10** enables an operator to selectively apply electric charge or to remove electric charge from a material sprayed by an electrostatic tool **12**. As illustrated, the electrostatic tool system **8** includes an electrostatic tool **12** configured to electrically charge and spray a material (e.g., paint, solvent, or various coating materials) towards an electrically attractive target. The electrostatic tool **12** receives sprayable material from a material supply **14**, and the electrostatic tool **12** sprays the material with compressed air from an air supply **16**.

As illustrated, the electrostatic tool **12** includes a handle **18**, a barrel **20**, and a spray tip assembly **22**. The spray tip assembly **22** includes a fluid nozzle **24**, an air atomization cap **26**, and retaining ring **28**. The fluid nozzle **24** may be removably inserted into a receptacle **30** of the barrel **20**. As illustrated, the air atomization cap **26** covers the fluid nozzle **24**, and is removably secured to the barrel **20** with the retaining ring **28**. The air atomization cap **26** includes a variety of air atomization orifices, such as a central atomization orifice **30** disposed about a liquid tip exit **32** from the fluid nozzle **24**. The air atomization cap **26** may also have one or more spray shaping air orifices, such as spray shaping orifices **34** that use air jets to force the spray to form a desired spray pattern (e.g., a flat spray). The spray tip assembly **22** may also include a variety of other atomization mechanisms to provide a desired spray pattern and droplet distribution.

The electrostatic tool **12** includes a variety of controls and supply mechanisms for the spray tip assembly **22**. As illustrated, the electrostatic tool **12** includes a liquid delivery assembly **36** having a liquid passage **38** extending from a liquid inlet coupling **40** to the fluid nozzle **24**. Included in the liquid delivery assembly **36** is a liquid tube **42**. The liquid tube **42** includes a first tube connector **44** and a second tube connector **46**. The first tube connector **44** couples the liquid tube **42** to the liquid inlet coupling **40**. The second tube connector **46** couples the liquid tube to the handle **18**. The handle **18** includes a material supply coupling **48**, enabling the electrostatic tool **12** to receive material from the material supply **14**. Accordingly, during operation, the material flows from the material supply **14** through the handle **18** and into the liquid tube **42**, where the material is transported to the fluid nozzle **24** for spraying.

In order to control liquid and air flow, the electrostatic tool **12** includes a valve assembly **50**. As will be explained in more detail below, the valve assembly **50** simultaneously controls liquid and air flow as the valve assembly **50** opens and closes. The valve assembly **50** extends from the handle **18** to the barrel **20**. The illustrated valve assembly **50** includes a fluid nozzle needle **52**, a shaft **54**, and an air valve needle **55**, which couples to an air valve **56**. The valve assembly **50** movably extends between the liquid nozzle **24** and a liquid adjuster **58**. The liquid adjuster **58** is rotatably adjustable against a spring **60** disposed between the air valve **56** and an internal portion **62** of the liquid adjuster **58**. The valve assembly **50** couples to a trigger **64** at point **65** (e.g., a pivot joint), such that the fluid nozzle needle **52** of the valve assembly **50** moves inwardly and away from the fluid nozzle **24** as the trigger **64** rotates in a clockwise direction **66**. As the fluid nozzle needle **52** retracts, fluid begins flowing into the fluid nozzle **24**. Likewise, when the trigger **64** rotates in a counter-clockwise direction **70**, the fluid nozzle needle **52** moves in direction **72** sealing the fluid nozzle **24** and blocking further fluid flow.

An air supply assembly **71** is also disposed in the electrostatic tool **12**, enabling atomization at the spray tip assembly **22**, with compressed air from the air supply **16**. The illustrated air supply assembly **71** extends from an air inlet **73** to the spray tip assembly **22** through an air passage **74** to the air atomization cap **26**. The air passage **74** includes multiple air passages including a main air passage **76**, an electric generator air passage **78**, an atomization air passage **122** (seen in FIG. **2**), and a shaping air passage **120** (seen in FIG. **2**). As mentioned above, the valve assembly **50** controls fluid and air flow through the electrostatic tool **12** through movement of the trigger **64**. As the trigger **64** rotates in a clockwise direction **66**, the trigger **64** opens the air valve **56**. More specifically, rotation of the trigger **64** in the clockwise direction **66** induces movement of the air valve **56** in direction **68** through movement of the air valve needle **55**. As the air valve **56** moves in direction **68**, the air valve **56** unseats from the sealing seat **80**, enabling air to flow from the main air passage **76** into an air plenum **82**. The air plenum **82** communicates with and facilitates airflow from the main air passage **76** into the electric generator air passage **78**, the atomization air passage **122** (seen in FIG. **2**), and the shaping air passage **120** (seen in FIG. **2**). In contrast, when the trigger **64** rotates in a counter-clockwise direction **70**, the air valve **56** moves in direction **72** resealing with the sealing seat **80**. Once the air valve **56** reseals with the sealing seat **80**, air is unable to travel from the air supply **16** through the main air passage **76** and into the air plenum **82**, for distribution into electric generator air passage **78**, the atomization air passage **122** (seen in FIG. **2**), and the shaping air passage **120** (seen in FIG. **2**). Accordingly, activation of the trigger **64** enables simultaneous liquid and airflow to the spray tip assembly **22**. Indeed, once an operator pulls the trigger **64**, the valve assembly **50** moves in direction **68**. The movement of the valve assembly **50** in direction **68** induces the fluid nozzle needle **52** to retract from the fluid nozzle **24**, enabling fluid to enter the fluid nozzle **24**. Simultaneously, movement of the valve assembly **50** induces the air valve **56** to unseat from the sealing seat **80**, enabling air flow through the main air passage **76** and into the air plenum **82**. The air plenum **82** then distributes the air for use by the spray tip assembly **22** (i.e., to shape and atomize), and by the power assembly **84**.

The power assembly **84** includes an electric generator **86**, a cascade voltage multiplier **88**, and an ionization needle **90**. As

explained above, the air plenum **82** enables air flow to distribute into an electric generator air passage **78**. The electrical generator air passage **78** directs airflow **79** from the air plenum **82** back through the handle **18** and into contact with a turbine (e.g., a rotor having a plurality of blades) or fan **92**. The airflow induces the turbine **92** to rotate a shaft **94**, which in turn rotates the electric generator **86**. The electrical generator **86** converts the mechanical energy from the rotating shaft **94** into electrical power for use by the cascade voltage multiplier **88**. The cascade voltage multiplier **88** is an electrical circuit, which converts low voltage alternating current (AC) from the electrical generator **86** into high voltage direct current (DC). The cascade voltage multiplier **88** outputs the high voltage direct current to the ionization needle **90**, which then creates an ionization field **96** for electrically charging atomized liquid sprayed by the electrostatic tool **12**.

As explained above, the electrostatic tool system **8** includes the electrostatic activation system **10** enabling the electrostatic tool **12** to spray coating material in an electrically charged mode and in an uncharged mode by connecting or disconnecting the electrical generator **86** from the cascade voltage multiplier **88**. For example, the electrostatic activation system **10** may include a Reed switch **100** that connects and disconnects the electrical generator **86** from the cascade voltage multiplier **88**. As will be explained in more detail below, the Reed switch **100** may complete an electric circuit in presence of a magnetic field and disconnect the electric circuit in the absence of a magnetic field. When the electrostatic activation system **10** connects the electrical generator **86** to the cascade voltage multiplier **88**, the electrostatic tool **12** electrically charges the coating material while spraying. However, when the electrostatic activation system **10** disconnects the electrical generator **86** from the cascade voltage multiplier **88**, the electrostatic tool **12** can continue to spray coating material, but is unable to charge the coating material. Accordingly, the electrostatic activation system **10** enables an operator to selectively apply or not apply an electric charge while spraying a coating material. For example, an operator may spray a target with an electrically charged coating material, but can stop charging the coating material to spray specific areas of the target unfavorable to electrostatic spraying (e.g., corners).

FIG. **2** is a cross-sectional view of the Reed switch **100**. The Reed switch **100** includes electrical wires **102** and **104** partially enclosed within a hermetically sealed container **106**. The electrical wires **102** and **104** are formed from stiff material and are placed within the container **106** in such way as to avoid contact. The wires **102** and **104** remain separated from one another until exposed to a magnetic field. In a magnetic field, the wires **102** and **104** attract one another, which bring the wires **102** and **104** into contact. When the wires **102** and **104** touch, they complete an electrical circuit enabling electrical power to travel through the wires **102** and **104**. Moreover, after removing the magnetic field, the wires **102** and **104** separate from one another to block the flow of electrical power through the Reed switch **100**. In the electrostatic tool system **8**, when the Reed switch **100** closes (i.e., wires **102** and **104** contact one another), the electrical generator **86** supplies power to the cascade voltage multiplier **88** for charging the coating material. However, when the Reed switch **100** opens (i.e., wires **102** and **104** separate), the Reed switch **100** blocks the flow of electrical power from the electrical generator **86** to the cascade voltage multiplier **88**, which blocks the electrostatic tool **12** from charging the coating material. In other embodiments, electrical power may be supplied by a battery, external power, a capacitor, etc.

FIG. **3** is a partial cross-sectional side view of an electrostatic tool **12** with an electrostatics activation system **10**. The electrostatics activation system **10** enables an operator to selectively apply or not apply an electric charge to a coating material while spraying. The electrostatics activation system **10** includes a Reed switch **100** and an electrostatics activation mechanism **118**. In other embodiments, electrostatic activation system **10** may use an optical switch, toggle switch, push button switch, slider switch, etc. The electrostatics activation device **118** includes an electrostatics trigger **120**, a magnet **122**, and a torsional spring **124**. A pin **126** couples the electrostatics trigger **120** and the spring **124** to the trigger **64**, thereby enabling the electrostatics trigger **120** to rotate clockwise and counterclockwise in directions **66** and **70**. Moreover, the attachment of the electrostatics trigger **120** to the trigger **64** with the pin **126** enables the electrostatics trigger **120** to rotate independently of the trigger **64**. In other embodiments, the electrostatics trigger **120** may be in a nested arrangement with the electrostatics trigger **120** with the trigger **120** coupled to the electrostatic tool **12** but extending through the trigger **64**. When the electrostatics activation system **10** is in an inactive state, the torsional spring **126** biases the trigger **120** in the counter-clockwise direction **70**. In the inactive state, a front portion **128** of the electrostatics trigger **120** projects through a trigger aperture **130** in the trigger **64**. Opposite the front portion **128** is a protrusion **132** in a back portion **134** of the trigger **120**. The protrusion **132** includes an aperture **136** that receives the magnet **122** for coupling the magnet **122** to the electrostatics activation system **10**. The magnet **122** may be press fit, glued, or fastened to couple the magnet **122** to the electrostatics trigger **120**. In other embodiments, the entire electrostatics trigger **120** may be made out of a magnetic material.

In FIG. **3**, neither the trigger **64** nor the electrostatics trigger **102** is depressed, which blocks compressed air and the coating material from flowing through the electrostatic tool **12**. However, when an operator depresses the trigger **64**, compressed air and coating material flows through and is sprayed by the electrostatic tool **12**. As explained above, the flow of compressed air through the electrostatic tool **12** enables the electrical generator **86** to produce power for use in applying a charge to the coating material. An operator may then depress the electrostatics trigger **120** to activate the electrostatics and charge the coating material while spraying. Depressing the electrostatics trigger **120** brings the magnet **122** into proximity with the Reed switch **100** resting in the handle **18**. The proximity of the magnet **122** to the handle **18** closes the Reed switch **100**, enabling electrical power to flow from the electrical generator **86** to the cascade voltage multiplier **88**. However, when the operator releases the electrostatic trigger **120**, the spring **124** rotates the electrostatics trigger **120** in the counter clockwise direction **70** away from the handle **18**. As the magnet **122** rotates away from the handle **18**, the Reed Switch **100** opens and blocks the flow of electrical power from the electrical generator **86** to the cascade voltage multiplier **88**. Accordingly, an operator may selectively add or remove electrical charge while spraying, by depressing and releasing the electrostatic trigger **120**.

FIG. **4** is a partial cross-sectional side view of an electrostatic tool system **8** with the electrostatics activation system **10** in an inactive state. In FIG. **4**, the trigger **64** is depressed and rotated in the counterclockwise direction **66** towards the handle **18**. As explained above, rotation of the trigger **64** in counterclockwise direction **66** enables the electrostatic tool **12** to spray coating material by releasing compressed air and coating material to flow through the electrostatic tool **12**. However, the electrostatic tool **12** will not electrically charge

the coating material when spraying, because the electrostatic activation system **10** is inactive. Specifically, until an operator depresses the electrostatics trigger **120** to rotate the magnet **122** into proximity with the Reed switch **100**, the Reed switch **100** will remain open and block the electrical power from traveling through the electrostatic tool **12**.

FIG. **5** is a partial cross-sectional side view of an electrostatic tool system **8** with the electrostatics activation system **10** in an inactive state. In FIG. **5**, the trigger **64** and the electrostatics trigger **120** are depressed and rotated in the counterclockwise direction **66** towards the handle **18**. As explained above, rotation of the trigger **64** in the counterclockwise direction **66** enables the electrostatic tool **12** to spray coating material by releasing compressed air and coating material to flow through the electrostatic tool **12**. Moreover, as the electrostatics trigger **120** rotates in the counterclockwise direction **66**, the magnet **122** approaches and closes the Reed switch **100**, enabling power to flow through the electrostatic tool **12** to charge the coating material while spraying. Specifically, the trigger **120** rotates in the clockwise direction **66**, thereby moving the magnet **122** into a gap **136**. The close proximity of the magnet **122** to the Reed switch **100** enables the magnetic field to close the Reed switch **100**. However, an operator may periodically desire to spray uncharged coating material. An operator may therefore continue spraying coating material by depressing the trigger **64**, but release the trigger **120** to stop the flow of electric power through the electrostatic tool **12**. The release of trigger **120** enables the spring **124** to rotate the trigger **120** in the clockwise direction **70**, thereby moving the magnet **122** away from the Reed switch **100**. As the magnet **122** moves away from the Reed switch **100**, the Reed switch **100** opens and blocks electrostatic charging of the coating material. Accordingly, the electrostatics activation system **10** enables an operator to selectively alternate between spraying electrically charged coating material and spraying electrically uncharged coating material.

FIG. **6** is a partial cross-sectional side view of an electrostatic tool **12** with an electrostatics activation system **10**. The electrostatics activation system **10** enables an operator to selectively apply an electric charge to a coating material while spraying. In FIG. **6**, the electrostatics activation system **10** includes an electrostatics activation mechanism **158**. The electrostatics activation mechanism includes an outer casing **160** that couples to the handle **18**. The outer casing **160** may be part of, welded to, or threaded into the handle **18**. The outer casing **160** includes a first aperture **162** that receives a plunger **164**. Opposite the first aperture **162** is a second aperture **166** in an annular wall **167**. The second aperture **166** enables a magnet **168** to activate the Reed switch **100** by passing through the annular wall **167** of the casing **160**. However, the annular wall **167** blocks movement of the plunger **164** through the aperture **166**. The electrostatics activation system **10** may include a gasket **170** between the plunger **164** and the casing **160**. The gasket **170** forms a seal between the casing **160** and the plunger **164**, such that the gasket **170** blocks the flow of fluids and materials through the outer casing **160**. The magnet **168** may couple to the plunger **164** and extend partially through a spring **172** that rests within the outer casing **160** between the annular wall **167** and the plunger **164**. In other embodiments, the magnet **168** may be replaced with an electrically conductive material that fills a space between conductive wires to complete an electrical circuit. In these embodiments, the gasket **170** blocks the flow of fluids and material that may interfere with or short an electrical connection in the electrostatics activation system **10**.

In FIG. **6**, the electrostatic tool **12** and the electrostatics activation system **10** is inactive. More specifically, neither the trigger **64** nor the plunger **164** is depressed, which blocks the electrically charging and spraying of coating material through the electrostatic tool **12**. However, when an operator depresses trigger **64**, the electrostatic tool begins spraying an uncharged coating material and enables the electrostatic activation system **10** to pass through the trigger aperture **130**. As explained above, the flow of compressed air through the electrostatic tool **12** enables the electrical generator **86** to produce power for use in applying a charge to the coating material. After depressing the trigger **64**, an operator may depress the plunger **164** to apply electrical charge to the coating material while spraying. Depressing the plunger **164** axially moves the plunger **164** and the magnet **168** in direction **72** and into proximity with the Reed switch **100** resting in the handle **18**. The proximity of the magnet **168** to the Reed switch **100** enables electrical power to flow from the electrical generator **86** to the cascade voltage multiplier **88**. However, when the operator releases the plunger **164**, the spring **172** axially biases the magnet **168** in direction **68** away from the Reed switch **100**. As the magnet **168** moves in direction **68**, the Reed Switch **100** opens and again blocks the flow of electrical power from the electrical generator **86** to the cascade voltage multiplier **88**. Accordingly, an operator may selectively add or remove electrical charge while spraying by depressing and releasing the plunger **164**.

FIG. **7** is a partial cross-sectional side view of an electrostatic tool system **8** with the electrostatics activation system **10** in an inactive state. In FIG. **7**, the trigger **64** is depressed and rotated in the counterclockwise direction **66** towards the handle **18**. As explained above, rotation of the trigger **64** in counterclockwise direction **66** enables the electrostatic tool **12** to spray coating material by releasing compressed air and coating material to flow through the electrostatic tool **12**. However, the electrostatic tool **12** will not electrically charge the coating material when spraying, because the electrostatic activation system **10** is inactive. Specifically, until an operator depresses the plunger **164**, axially moving the magnet **168** into proximity with the Reed switch **100**, the Reed switch **100** will remain open, blocking the electrical power from traveling through the electrostatic tool **12**.

FIG. **8** is a partial cross-sectional side view of an electrostatic tool system **8** with the electrostatics activation system **10** in an active state. In FIG. **8**, the trigger **64** and the plunger **164** are respectively depressed towards the handle **18**. As explained above, rotation of the trigger **64** in the counterclockwise direction **66** enables the electrostatic tool **12** to spray coating material by releasing compressed air and coating material to flow through the electrostatic tool **12**. Moreover, as the plunger **164** axially moves in direction **72**, the magnet **168** approaches and closes the Reed switch **100**, enabling power to flow through the electrostatic tool **12**, which charges the coating material while spraying. Specifically, the plunger **164** moves in axial direction **72** enabling the magnet **168** to extend through aperture **166**. The close proximity of the magnet **168** to the Reed switch **100** enables the magnetic field to close the Reed switch **100**. However, during spraying operations, it may be desirable to spray uncharged coating material. An operator may therefore continue spraying the coating material by depressing the trigger **64**, but selectively release the plunger **164** to stop the flow electric power through the electrostatic tool **12**. The release of plunger **164** enables the spring **172** to axial move the magnet **168** and plunger **164** in direction **68** away from the Reed switch **100**, which will open the Reed switch **100**. Accordingly, the electrostatics activation system **10** enables an operator to selec-

tively alternate between spraying electrically charged coating material and spraying electrically uncharged coating material.

FIG. **9** is a partial rear cross-sectional view of an electrostatic tool **12** with an electrostatic activation system **10**. In FIG. **9**, the electrostatic activation system **10** includes two electrostatics activation mechanisms **188** on respective sides **190** and **192** of the handle **18**. The electrostatics activation mechanisms **188** enable an operator to close a Reed switch **100**. The inclusion of two electrostatics activation mechanisms **188** enables left-handed and right-handed operators to use one kind of electrostatic tool **12**. As explained above with respect to the electrostatics activation mechanism **158**, the plungers **194** and **196** axially move within their respective outer casings **198** and **200**. As the plungers **194** and **196** move axially, the plungers **194** and **196** move respective magnets **202** and **204** into proximity with the Reed switch **100** resting in the handle **18**. The proximity of either magnet **202** or **204** to the Reed switch **100** closes the Reed switch **100**, enabling electrical power to flow from the electrical generator **86** to the cascade voltage multiplier **88**. However, when the operator releases the plungers **194** or **196**, the springs **206** and **208** axially bias the magnets **202** and **204** away from the Reed switch **100**. As the magnets **202** and **204** move away from the Reed switch **100**, the Reed Switch **100** opens and again blocks the flow of electrical power from the electrical generator **86** to the cascade voltage multiplier **88**. Accordingly, an operator may selectively add or remove electrical charge while spraying by depressing and releasing either plunger **194** or **196** located on the sides **190** and **192** of the handle **18**.

FIG. **10** is a partial cross-sectional view of an electrostatic activation system **10** along line **10-10** in FIG. **6**. As illustrated, a gasket **170** may rest between the outer casing **160** and the plunger **164**. An aperture **220** in the outer casing **160** may receive the gasket **170** to hold the gasket **170** in place. Alternatively, the gasket **170** may rest within an aperture in the plunger **164**. The gasket **170** provides a fluid tight seal between the plunger **164** and the outer casing **160** to block the flow of fluid or other material from entering the electrostatic activation system **10**.

While only certain features of the invention have been illustrated and described herein, many modifications and changes will occur to those skilled in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes as fall within the true spirit of the invention.

The invention claimed is:

1. A system, comprising:

an electrostatic tool comprising:

a handle;

a first trigger configured to move between a first trigger position and a second trigger position, wherein the electrostatic tool is configured to block a fluid flow in the first trigger position, and the electrostatic tool is configured to enable the fluid flow in the second trigger position to apply a coating material; and

an electrostatic activation system comprising a second trigger configured to selectively activate and deactivate electrical charging of the coating material, wherein the second trigger is disposed along the first trigger;

wherein the electrostatic tool comprises at least one of: the first and second triggers are directly coupled together, or the first and second triggers are disposed in a nested arrangement, or the first and second triggers have separate user contact surfaces, or a combination thereof.

2. The system of claim **1**, wherein the second trigger is configured to close a switch by moving between a first electrostatic position away from the handle and a second electrostatic position towards the handle.

3. The system of claim **2**, wherein the second trigger couples to the first trigger and is configured to move independently of the first trigger.

4. The system of claim **3**, wherein the switch is a reed switch and the second trigger comprises a magnet, and the second trigger is configured to activate the reed switch with the magnet when the second trigger is in the second electrostatic position.

5. The system of claim **1**, wherein the handle includes a handle aperture exposing a reed switch.

6. The system of claim **1**, wherein the electrostatic activation system comprises a plunger configured to move axially within a casing.

7. The system of claim **6**, wherein the plunger is configured to move a magnet between a first electrostatic position that activates a reed switch and a second electrostatic position that deactivates the reed switch.

8. The system of claim **7**, wherein the plunger is configured to extend through a trigger aperture in the first trigger when the first trigger is in the second position.

9. The system of claim **8**, wherein the casing does not extend through the trigger aperture of the first trigger.

10. The system of claim **6**, wherein a spring is configured to move the plunger from the first electrostatic position to the second electrostatic position.

11. The system of claim **6**, wherein the casing is coupled to the handle.

12. The system of claim **1**, wherein the first and second triggers are directly coupled together.

13. The system of claim **1**, wherein the first and second triggers are disposed in the nested arrangement.

14. The system of claim **13**, wherein the nested configuration has the second trigger extending at least partially through a trigger aperture in the first trigger.

15. The system of claim **1**, wherein the first and second triggers have separate user contact surfaces.

16. A system, comprising:

a trigger assembly configured to couple to an electrostatic tool, wherein the trigger assembly comprises:

a first trigger configured to move between a first trigger position and a second trigger position, wherein the first trigger position is configured to control the electrostatic tool to block a fluid flow, and the second trigger position is configured to control the electrostatic tool to enable the fluid flow to apply a coating material; and

a second trigger configured to selectively activate and deactivate electrical charging of the coating material via an electrostatic system, wherein the second trigger is disposed along the first trigger;

wherein the electrostatic tool comprises at least one of: the first and second triggers are directly coupled together, or the first and second triggers are disposed in a nested arrangement, or the first and second triggers have separate user contact surfaces, or a combination thereof.

17. The system of claim **16**, wherein the first and second triggers are directly coupled together.

18. The system of claim **16**, wherein the first and second triggers are disposed in the nested arrangement.

19. The system of claim **18**, wherein the nested configuration has the second trigger extending at least partially through a trigger aperture in the first trigger.

20. The system of claim **16**, wherein the first and second triggers have separate user contact surfaces.

21. A system, comprising:

an electrostatic tool comprising:

a handle;

a first trigger configured to move between a first trigger position and a second trigger position, wherein the electrostatic tool is configured to block a fluid flow in the first trigger position, and the electrostatic tool is configured to enable the fluid flow in the second trigger position;

an electrostatic activation system comprising a second trigger configured to activate and deactivate electrical charging of the coating material, wherein the second trigger is disposed along the first trigger, and the first and second triggers are configured to be user actuated independent from one another.

22. The system of claim **21**, wherein the second trigger comprises a plunger that extends through a trigger aperture in the first trigger when the first trigger is in the second trigger position.

23. The system of claim **22**, wherein the plunger is configured to move a magnet between a first electrostatic position that activates a reed switch and a second electrostatic position that deactivates the reed switch.

24. The system of claim **21**, wherein the second trigger includes a first plunger and a second plunger on opposite sides of the handle.

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